Michigan Department of Community Health

MDCH

# LabLink

Laboratory Information from the Michigan Department of Community Health - Bureau of Laboratories

**Vol. 3 No. 2** **November 1997**

## MDCH Influenza Surveillance, 1997-98 Season

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Virology Section

The 1997-98 influenza season is almost upon the Midwest. Nine states, including Michigan, have reported laboratory confirmed influenza since September. All isolates were influenza type A, except for one isolate of type B in West Virginia. This year the Virology Section and the Communicable Disease Epidemiology Division of the Michigan Department of Community Health are making Influenza testing services available for the purpose of monitoring the spread of this virus epidemiologically. Rather than isolation and detection of influenza found in random clinical specimens, MDCH will emphasize a systematic epidemiological approach by recruiting 28 sentinel physicians with practices throughout Michigan. Over a six month period each sentinel physician will submit 9 specimens from patients presenting with acutely febrile Influenza-like illness. Laboratory data will be transmitted to participating sentinel physicians and the Centers for Disease Control and Prevention (CDC) in an effort to forewarn about the strain(s) circulating in Michigan.

Because of influenza's tendency for antigenic change, the CDC considers influenza to be a reemerging disease. Intra-epidemic episodes occur, in part, due to the unique molecular structure of the influenza virus. The virus consists of 8 segmented RNA genes, most of which code for a different virus protein. Such a strategy lends itself to the process of gene reassortment through mechanisms called shift and drift against which the infected host has antibody naiveté. As a result, new strains emerge. Drastic changes in the virus at the molecular level occur on an average of every 10 years, although this time interval is disputable.

During the 1996-97 season, the most prevalent strain in Michigan was influenza A (approximately 94% of all influenza virus isolates) and all subtyped as H3N2. Toward the end of the season influenza B emerged. Two isolates were characterized as Beijing-like.

The 1997-1998 vaccine is composed of the following strains:

1. A/Wuhan/359/95(H3N2)-like
2. A/Bayern/07/95(H1N1)-like
3. B/Beijing/184/93-like

The H1N1 component has been changed from the previous year.

We encourage vaccination, especially the elderly and anyone with respiratory problems. Updated information on influenza surveillance will appear in this publication as it becomes available.

(As in years past, we are requesting that you help break the myth by reminding patients and colleagues that there is no such thing as the gastrointestinal "flu". Ed.)

DCH-0096

# DT104:

## *Salmonella* serotype Typhimurium with an Attitude

Frances Pouch Downes, Dr.P.H.
Division of Infectious Disease

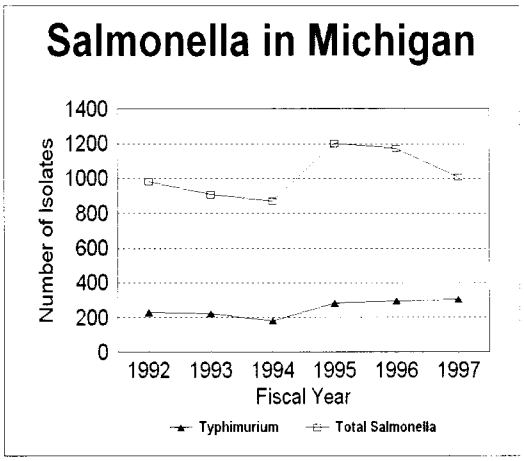
Since 1984 in the United Kingdom and more recently in the United States, *Salmonella* serotype Typhimurium phage type DT104 has been recognized as an emerging food borne pathogen. In a UK study this *Salmonella* strain was associated with more severe illness than other nontyphoidal *Salmonella* with higher rates of hospitalization and higher case fatality rates.

*S.* ser. Typhimurium DT104 is often resistant to multiple antimicrobial agents, frequently demonstrating a pattern of penta-resistance to ampicillin, chloramphenicol, streptomycin, sulfonamide and tetracycline (R-type ACSSuT). The R-type ACSSuT was demonstrated in 28% of *S.* ser. Typhimurium isolates submitted to the Center for Disease Control in 1995, compared to 7% of the *S.* ser. Typhimurium isolates tested in 1990. In addition to the penta-resistance pattern, resistance to trimethoprim and fluoroquinalones is emerging in the UK. Resistance to ciprofloxacin emerged subsequent to the approval of the fluoroquinalone enrofloxacin for veterinary use. Although fluoroquinalone resistance has not yet been documented in the US, its emergence will be significant because ciprofloxacin is a current treatment of choice for human salmonella infections. The Food and Drug Administration has approved the fluoroquinalone sarafloxacin for treatment of *Escherichia coli* infections in poultry. It will now be important for public health laboratories to monitor for the emergence of fluoroquinalone resistance in *S.* ser. Typhimurium because of the related antimicrobial agents in human medicine and food production.

The mechanism of introduction of this organism into human foods in the United States is not well documented, but probably involves the ecology of wild and farm animals and food processing, distribution and preparation.

In Michigan, as well as the United States, *S.* ser. Typhimurium infections in humans are increasing. In fiscal year (October through September) 1996, 294 *S.* ser. Typhimurium were identified among the 1171 *Salmonella* isolated from humans and submitted for serotyping at MDCH, representing the most frequently identified serotype. In fiscal year 1997, 303 *S.* ser. Typhimurium from human isolates have been identified at MDCH (Table 1). To monitor for the emergence of DT104 and fluoroquinalone resistance in DT104 in Michigan, the Microbiology Section will examine all *S.* ser. Typhimurium identified in 1996, 1997 and 1998 for R-type ACSSuT. Any suspect DT104 isolates will be examined by pulsed field gel electrophoresis to establish DNA fingerprint patterns, tested for resistance to ciprofloxacin and submitted to CDC for phage typing. For adequate surveillance it is important that all *Salmonella spp.* isolates be serotyped. To detect the emergence of DT104 and to detect local and regional cluster and outbreaks, we ask that all clinical laboratories continue to submit all *Salmonella* isolates for serotyping. Your cooperation is essential in responding to this food borne threat.

Table 1




## LEPTOSPIRA TESTING NO LONGER AVAILABLE AT MDCH

Patty Clark, Viral Serology Unit

In the past, Leptospira antibody testing had been available at MDCH on serum samples using a Macroscopic Slide Agglutination Assay. A decreasing volume of samples has resulted in the decision to discontinue this testing. It is no longer cost effective to keep the necessary reagents on hand for this volume of samples. Therefore, as of September 1997, all requests for Leptospira testing will be sent to CDC. Please include a CDC form when submitting samples for Leptospira testing.

## Unsatisfactory GenProbe Results

GenProbe specimens evaluated as unsatisfactory are not tested by the laboratory. During the first ten months of this year (Jan. 1 to Oct. 24) we have had an unsatisfactory rate of about 1.6%. We feel this is too high. We have been phoning submitters in an attempt to lower our unsatisfactory rate. Please read the product insert from the GenProbe collection kit and follow the instructions carefully. Please check the following *Troubleshooting Guide to Prevent Unsatisfactory GenProbe Specimens* (page 3) for ways to prevent the most common problems causing unsatisfactory reports. For any questions or concerns regarding GenProbe testing or results, contact Bill Schneider at (517) 335-9343.

## *Troubleshooting Guide to Prevent Unsatisfactory GenProbe Specimens*

| Unsatisfactory | Explanation | Prevention |
|---|---|---|
| **No swab in tube** | The male collection kit contains one cotton-tipped swab. The female kit contains two swabs. The first female swab is used to remove excess mucus and is discarded. The second is used to collect the specimen and is broken off at the scored area in the collection tube. The swabs, from both male and female kits, must be left in the collection tube for transport to the laboratory. | Examine the tubes before sending them. Do not send tubes that do not contain swabs. |
| **Expired collection tube** | The expiration date of each collection kit is printed on the outside of the kit wrapper and on each collection tube. Specimens will not be tested if the collection kit has expired. | Check expiration dates before collecting the specimen. Discard out-dated kits immediately. Order new MDCH unit #2 kits by calling (517) 335-9867. |
| **Improper collection site** | The GenProbe PACE 2 system is only designed to test conjunctival, female endocervical and male urethral specimens. It is not recommended for medicolegal cases and is not acceptable for throat or rectal swabs or for antimicrobial susceptibility testing. | Use another system for throat or rectal specimens. *Neisseria gonorrhoeae* must be cultured for susceptibility testing. |
| **Wrong swab used** | The system is only approved for use with swabs supplied in the collection kits. These swabs have been tested and will not alter the biochemical reactions of the test. | Do not use wooden swabs or any other non-GenProbe swabs. |
| **Wrong kit used** | The collection kits are different for males and females. The male kit contains 0.5 ml of fluid. The female kit contains 1 ml of fluid to make up for the fluid that is soaked up by the larger female swab. Using the wrong tube or swab changes the proportion of fluid to specimen and may give erroneous results. | Check to match up the swab type and collection tube with the patient's gender. |
| **Quantity not sufficient (QNS)** | There is not enough specimen to perform the testing. It may have leaked out in transit. Sometimes the specimen is very mucoid or the swab has disintegrated and the specimen cannot be pipetted. | Put caps on tightly and make sure caps are threaded properly. Be sure to send only the second female swab. Do not twirl the swab excessively in the specimen or cut the swab too long and force it into the collection tube. |
| **No specimen received** | When a form is received without a matching specimen, it is unknown if the specimen was lost in the mail or just not sent by the submitter. Label each specimen properly, place it in the inner container and place the completed form with the specimen in the outer container. | Make sure there is a form in the outer container that matches each specimen in the inner container before mailing the specimens. |
| **No patient ID on the specimen** | Collection directions and federal regulations require writing the patient's name or other unique identifier, on the specimen collection tube as well as on the test requisition form. Specimens are opened and numbered in an area outside of the laboratory. This allows us an opportunity to double check the correct identification of the specimens. | Write the name or unique identifier on the tube. Make sure it matches the identifier on the test requisition. |
| **Specimen greater than 7 days old** | The system is approved for use on specimens for seven days after collection. Testing after seven days may result in invalid results. | Mail specimens promptly after collection. Use mailing labels supplied with specimen kits. |
| **Patient under 12 years of age** | The system has not been approved for use with patients under 12 years of age. | Use an alternative method to test patients under 12 years of age. |

# Norwalk and Norwalk-Like Virus (SRSV) Testing at MDCH

Steve Michalik, MA, Molecular Biology Section

Small round structured viruses (SRSVs), also called Norwalk-like viruses, are positive strand RNA viruses 27-29 nm in size classified in the family *Calciviridae*. SRSVs have been implicated as the major cause of outbreaks associated with food and waterborne acute nonbacterial gastroenteritis.[1,2,3] It was estimated that at least 42% of outbreaks of non-bacterial gastroenteritis in the US were due to SRSVs.[4] Sequence analysis of the RNA polymerase gene from various SRSV strains has led to the distinction of two genogroups among the viruses infecting humans. Norwalk virus (NV) is the prototype of genogroup I, which also includes Southampton virus, and is phylogenetically distinct from viruses of genogroup II, which include the prototype Snow Mountain agent, Bristol, Hawaii, Toronto, and Mexico viruses.[5,6] Both groups have world wide distribution, though the Snow Mountain agent appears to be the predominant cause of gastroenteritis in most regions studied.[7]

The clinical symptoms of SRSV infection in adults commonly present as nausea, explosive projectile vomiting and/or diarrhea. Other features, such as fever, headache, abdominal cramps, and chills, occur in a minority of patients. While the symptoms arising from infection are profound, the infections are self-limiting. Mortality in the absence of other complicating factors is extremely rare. The fecal-oral route is established as the most important mode of transmission with subsequent person to person spread. However, airborne transmission arising from aerosolized vomit following projectile vomiting is also a potential problem. SRSVs have a primary attack rate which may exceed 50% (10-100 virus particles), with a significant secondary attack rate in family contacts.[3] Transmission is followed by an incubation period of 15-72 hours with a mean range of 24 to 48 hours.[8] Studies using ELISA in ill volunteers determined that shedding of NV occurred in >90% of ill volunteers and persisted up to 2 weeks.[9]

Food and waterborne outbreaks associated with SRSVs have a distinctive epidemiological profile. Criteria for suspecting an outbreak is due to SRSV are as follows: (1) vomiting and diarrhea in > 50% of cases, (2) mean duration of illness 12-60 hours, (3) incubation period (if known) of 15-72 hours, (4) stool cultures negative for bacterial pathogens.[3]

The MDCH Molecular Epidemiology Section has been offering a polymerase chain reaction (PCR) assay for the detection of SRSVs from fecal specimens for approximately two years. We are currently investigating an assay to detect SRSVs in foods. SRSV PCR will not be offered for individual diagnostic purposes. Contact Dr. Jaime Altamirano, MDCH Communicable Disease Epidemiology Division at (517) 335-8165 for testing availability prior to submitting samples from suspected food or waterborne outbreaks of SRSV. Only samples approved for testing by Communicable Disease Epidemiology Division will be tested.

Stool specimens for SRSV PCR should be collected within 48-72 hours of onset of symptoms. Each specimen should contain a minimum of 1 ml of fresh diarrheal stool collected in a clean dry container (e.g., 50 ml conical tube). All specimens should be refrigerated immediately at 2-8°C and should be stored for batch submission. Specimens can be shipped up to two weeks after outbreak onset. Label each specimen container with a waterproof marker and individually wrap each specimen container in sealed waterproof containers (e.g., plastic ziplock bags). A virology test requisition form (FB200) must accompany each sample to be tested. Use the "Norwalk Virus, stool by PCR" box in the bottom left-hand side of the form in the Molecular Epidemiology section. MDCH will test up to ten samples per outbreak. Place bagged and sealed specimens with frozen refrigerant packs in an insulated box and ship to the Lansing Lab by the fastest means available.

Technical questions regarding SRSV PCR testing should be directed to Steve Michalik, Molecular Biology Section, at (517) 335-9453.

1. Ando, T. 1990. Small round structured viruses (SRSV): Epidemiology of novel human gastroenteritis viruses in Japan. Modern Media. **36**:438-463.

2. Kapikian, A.Z., R.M. Chanock. 1990. Norwalk group of viruses, p. 671-693. In B.N. Fields, D.M. Knipe, R.M. Chanock, M.S. Hirsch, J.L. Melnick, T.P. Monath, and B. Roizman (ed). Virology. Raven Press Ltd., New York, N.Y.

3. Viral Gastroenteritis Sub-committee of the PHLS Virology Committee. 1993. Outbreaks of gastroenteritis associated with SRSV's. PHLS Microbiology Digest. **10**:2-8.

4. Kaplan, J.E., R. Feldman, D.S. Campbell, C. Lookabaugh, and G.W. Gary. 1982. The frequency of a Norwalk-like pattern of illness in outbreaks of acute gastroenteritis. Am. J. Public Health. **72**:1329-1332.

5. Ando, T., M.N. Mulder, D.C. Lewis, M.K. Estes, S.S. Monroe, and R.I. Glass. 1994. Comparison of the polymerase region of small round structured virus strains previously classified in three antigenic types by solid-phase immune electron microscopy. Arch. Virol. **135**:217-226.

6. Berke, T., B. Golding, X. Jiang, D.W. Cubitt, M. Wolfaardt, A.W. Smith, and D.O. Matson. 1997. Phylogenetic analysis of the Caliciviruses. J. Med. Virol. **52**:419-424.

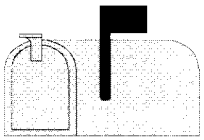
7. Jaing, X., E. Turf, J. Hu, E. Barrett, X.M. Dai, S. Monroe, C. Humphrey, L.K. Pickering, and D.O. Matson. 1996. Outbreaks of gastroenteritis in elderly nursing homes and retirement facilities associated with human caliciviruses. J. Med. Virol. **50**:335-341.

8. Caul, O.E. 1996. Viral gastroenteritis: small round structured viruses, caliciviruses and astroviruses. Part I. The clinical and diagnostic perspective. J. Clin. Pathol. **49**:874-880.

9. Okhuysen, P.C.,X. Jaing, Y. Liming, P.C. Johnson, and M.K. Estes. 1995. Viral shedding and fecal IgA response after norwalk virus infection. J. Infect. Dis. **171**:566-569.

# Shipping Specimens to MDCH

Sam Davis
Office of Quality Assurance



On September 18, 1997, United Parcel Service announced that beginning October 1, 1997 they would no longer accept hazardous materials for delivery via any UPS service from commercial counter locations.

What does this mean to the clinical laboratory?

First - determine if what is being shipped is a "Clinical Specimen (a.k.a. Diagnostic Specimen)" or an "Infectious Agent (a.k.a. Etiologic Agent - Hazardous Material)."

The U.S. Postal Service defines a "Clinical Specimen" as "any human or animal material including, but not limited to, excreta, secreta, blood and its components, tissue, and tissue fluids . . . being shipped for purposes of diagnosis" or as redefined by the Centers for Disease Control and Prevention, March 5, 1997, "Specimens that have a relatively low probability to contain pathogens . . . "

An "Infectious Agent" as defined by the U.S. Postal Service means "a microbiological agent or its toxin that causes, or may cause human or animal disease or as redefined by the Centers for Disease Control and Prevention on March 5, 1997, "Substances **known to contain**, or reasonably expected to contain, Pathogens."

If the item being shipped meets the "Clinical Specimen" classification - you may continue to ship via UPS, **until January 1, 1998.** After that time, UN 6.2 packaging will be required by UPS for Clinical Specimens.

If the item being shipped meets the "Infectious Agent (a.k.a. Etiologic Agent - Hazardous Material - Infectious Agent)" or "Clinical Specimen," definitions you may continue to ship by First Class, Priority or Express U.S. Mail - using the labels and mailers currently provided by MDCH.

**Note: Exceptions to this are those agents listed in 42 CFR 72.3(f) which must be sent by Registered Mail.**

If the material is to be shipped by air, Clinical Specimens or Infectious Agents, the Infectious Substance label specified in 134.5 of the International Mail Manual, the proper shipping name and United Nations (UN Number) as well as a shippers declaration for dangerous goods must be completed. This is what is commonly called UN 6.2 packaging.

**Cool Web Sites**

1. http://www.healthfinder.gov is a government web site that offers fast and reliable health information.
2. http://www.outbreak.org is an on-line information service addressing emerging diseases.
3. http://commtechlab.msu.edu/sites/dlc-me/zoo/, is an educational program called the Microbe Zoo. It is an ecological microbial site good for school age children.

# Vancomycin Intermediate Susceptible *Staphylococcus aureus* (VISA)

Barbara Robinson-Dunn, Ph.D.,
Microbiology Section, Lansing
William S. Sottile, Ph.D., Houghton Laboratory

The existence and prevalence of methicillin resistant *Staphylococcus aureus* (MRSA) throughout Michigan is well documented. The considerable expense of isolation and treatment of patients infected with MRSA is also well documented. The anti-microbial agent of choice, and sometimes the only effective agent, for serious infections with MRSA has been vancomycin. The first case of *S. aureus* with reduced susceptibility to vancomycin (VISA) in the United States was discovered in Michigan this July.

The standard disk diffusion (Kirby-Bauer) method of antimicrobic susceptibility testing yields falsely susceptible results with this organism. Therefore, Kirby-Bauer testing can not be used to determine susceptibility to vancomycin. Dilution methods, to determine minimal inhibitory concentrations (ie. MICs), are more accurate at detecting the reduced susceptibility to vancomycin by *S. aureus*. The interpretive breakpoints for vancomycin by dilution methods are:

| | |
|---|---|
| Susceptible | $\leq 4$ $\mu$g/ml |
| Intermediate | 8 to 16 $\mu$g/ml |
| Resistant | >32 $\mu$g/ml |

Clinical laboratories and local health departments which become aware of VISA isolates are urged to contact Dr. Barbara Robinson-Dunn at (517) 335-8067. Isolates of *S. aureus* with vancomycin MICs of $\geq 4$ $\mu$g/ml should be forwarded to MDCH for further testing.

# Videotapes for In-Service Training

**The Microbiology Section has copies of the following videotapes to lend for your in-service training needs:**

1. "Can You Afford To Be Safe? Packaging and Shipping of Laboratory Specimens", w/handout. Done by the NLTN and the Alabama Dept. of Public Health
2. "Vancomycin Resistant Enterococci:Control of an Emerging Pathogen". Copy of the Sept. 25, 1997 CDC videoconference.
3. "Cough it Up" English, Spanish and Vietnamese versions. Texas Dept. Of Health. How to obtain a correct sputum specimen.
4. "*E. coli* O157:H7--What the Clinical Microbiologist Should Know" w/handout. CDC
5. "Recognition and Prevention of False-Positive Test Results in Mycobacteriology", a laboratory training program from CDC and the Assoc. Of State and Territorial Public Health Laboratory Directors.

These videotapes are available for loan by calling Susan Shiflett at (517) 335-9763.

**Antimicrobial Resistance Trends, Regions One (Reg1, Detroit Area) and Two to Twelve (Reg2-12,Outstate Michigan)**
**Penicillin Resistant Study-site[1] Isolates of *Streptococcus pneumoniae***
**and Vancomycin Resistant Sterile-site[2] Isolates of *Enterococcus spp.***
**Michigan Sentinel Hospital Laboratory Survey, Fourth Quarter, 1995 through First Quarter, 1997**

Percent Resistant[3]

| | | 1995 Quarters | | | | 1996 Quarters | | | | | | 1997 Quarters | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Resistance | Fourth | | First | | Second | | Third | | Fourth | | First | |
| Microorganism | Classification[3] | Rg 1 | Rg 2-12 | Rg 1 | Rg 2-12 | Rg 1 | Rg 2-12 | Rg 1 | Rg 2-12 | Rg 1 | Rg 2-12 | Rg 1 | Rg 2-12 |
| *Str. pneumoniae* | Moderate or High | 20 | 14 | 20 | 19 | 23 | 20 | 34 | 20 | 26 | 14 | 28 | 16 |
| *Str. pneumoniae* | High Level only | 5 | 4 | 5 | 2 | 5 | 3 | 9 | 4 | 8 | 4 | 10 | 5 |
| *E. faecalis* | Resistant | 1 | 0 | 2 | 1 | 1 | 0 | 3 | 1 | 3 | 1 | 3 | 1 |
| *E. faecium* | Resistant | 33 | 7 | 37 | 13 | 48 | 9 | 35 | 5 | 44 | 9 | 42 | 6 |
| Total *Enterococcus* | Resistant | 7 | 1 | 9 | 3 | 10 | 2 | 9 | 3 | 10 | 2 | 15 | 2 |

[1] Study sites = blood, CSF, deep surgical wound, pleural fluid(fl.), peritoneal fl., respiratory specimens or synovial fl.

[2] Sterile sites = blood, CSF, deep surgical wound, pleural fluid(fl.), peritoneal fl., or synovial fl.

[3] NCCLS, Performance Standards for Antimicrobial Susceptibility Testing, M100-S7.

**LabLink** is published quarterly by the Michigan Department of Community Health, Bureau of Laboratories, to provide laboratory information to Michigan Health professionals and the public health community.

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